

CLAIMS

1. Mold (10) for fabricating a silica-based preform intended to be sintered, adapted to receive a slurry based on amorphous silica powder and a liquid, having an interior portion (14) and an exterior portion (12) adapted to delimit a wall (38) of said preform, at least in an area delimiting a usable portion of said wall (38), only one of said interior portion (14) and exterior portion (12), called the "permeable portion" (14), being permeable to said liquid, characterized in that in at least one area delimiting a usable portion of said wall at least one of said interior and exterior portions is deformable.
2. Mold according to claim 1, characterized in that, in said area, the distance between said interior portion (14) and said exterior portion (12) is substantially constant.
3. Mold according to claim 2, characterized in that, in said area, the distance between said interior portion (14) and said exterior portion (12) is less than 10 cm, preferably less than 5 cm.
4. Mold according to any one of the preceding claims, characterized in that said permeable portion (12) is made of a material absorbing said liquid in a similar manner to plaster.
5. Mold according to any one of the preceding claims, characterized in that said portion that is not permeable to said liquid, called the "impermeable portion" (14), includes a liner (30) deformable as a result of a modification of the dimensions of said preform during its fabrication.
6. Mold according to claim 5, characterized in that said liner (30) is conformed to be removed or "peeled" toward the interior of said preform avoiding all contact with said preform.
7. Mold according to either claim 5 or claim 6 characterized in that said liner (30) is sufficiently deformable to allow forcible passage of a protuberance of said preform having a height less than or equal to 1.1 times the thickness of said liner (30) during the removal of said preform from the mold.
8. Mold according to any one of claims 5 to 7, characterized in that said liner (30) is made of a material that is inert with respect to said slurry.
9. Mold according to any one of claims 7 to 8, characterized in that said liner does not adhere to said preform or may be unstuck from said preform by deformation of said liner (30) during removal from the mold.
10. Mold according to any one of claims 5 to 9, characterized in that said

liner (30) is made of silicone or a cellular material.

11. Mold according to any one of claims 5 to 10, characterized in that said liner (30) includes air injection holes (34).

5 12. Mold according to any one of claims 5 to 11, characterized in that said impermeable portion (14) includes a support (31) of said liner (30).

13. Method of fabricating a sintered silica part, comprising the following steps:

10 a) casting a slurry based on amorphous silica powder and a liquid between an interior portion (14) and an exterior portion (12) of a mold (10) according to any one of the preceding claims to delimit a wall (38) of said part (40),

b) at least partially evacuating said liquid to obtain a preform,

c) removing said preform from the mold to obtain a green part,

d) further drying said green part,

e) sintering said green part,

15 characterized in that, in the step b), in at least one area delimiting a usable portion of said wall (38), said liquid is evacuated through one only of said interior portion (14) and said exterior portion (12) of said mold (10), called the "permeable portion" (12), the other portion being called the "impermeable portion" (14).

20 14. Method according to claim 13, characterized in that, prior to the step e), a coating material is applied to said green part.

15. Method according to claim 14, characterized in that said coating material is a precursor of silicon nitride ( $\text{Si}_3\text{N}_4$ ).

25 16. Method according to any one of claims 13 to 15, characterized in that, during the step b), feeding of said mold (10) with slurry continues to compensate the evacuation of said liquid.

17. Method according to any one of claims 13 to 16, characterized in that, during the step b), to encourage the elimination of bubbles in said slurry, a reduced pressure is maintained in the container that contains the slurry before casting and/or independently in said mold.

30 18. Method according to any one of claims 13 to 17, characterized in that, said mold (10) conforming to any one of claims 6 to 13, during the step c) of removal of the mold, said support (31) and said liner (30) are separated from said preform independently of each other.

35 19. Method according to any one of claims 13 to 18, characterized in that said slurry contains a powder based on amorphous silica mixed with a solvent, the

particle size range of said powder conforming to the Füller-Bolomey law.

20. Method according to claim 19, characterized in that said powder contains a mixture of at least two amorphous silica powders.

5 21. Method according to either claim 19 or claim 20, characterized in that said powder contains only particles whose size is from 0.1 to 620  $\mu\text{m}$ .

22. Method according to either claim 19 or claim 20, characterized in that said powder includes only particles whose size is from 0.2 to 200  $\mu\text{m}$ .

23. Method according to any one of claims 19 to 22, characterized in that said slurry contains more than 85% of dry material.

10 24. Method according to any one of claims 19 to 23, characterized in that said slurry has a viscosity from 1 to 30 Poises at the beginning of the casting step a).

25. Method according to any one of claims 19 to 24, characterized in that the dry fraction of said slurry contains more than 99.5% silica.

15 26. Method according to any one of claims 19 to 25, characterized in that said silica powder has a specific surface area from 0.01 to 20  $\text{m}^2/\text{g}$ .

27. Method according to any one of claims 19 to 26, characterized in that said liquid is water.

28. Method according to any one of claims 19 to 27, characterized in that it includes a step of casting under pressure.

20 29. Green part fabricated by the steps a) to c) of a method according to any one of claims 13 to 28 and therefore having no divergence front, characterized in that it has a three-point bending strength from 2 to 10 MPa.

30. Green part according to claim 29, characterized in that it has a density greater than 1.9  $\text{g}/\text{cm}^3$ .

25 31. Sintered silica part fabricated by a method according to any one of claims 13 to 28, characterized in that it has a three-point bending strength from 16 to 30 MPa.

32. Sintered silica part according to claim 31, characterized in that it has a density from 1.6 to 2.2  $\text{g}/\text{cm}^3$ .

30 33. Use of a sintered silica part according to either claim 31 or claim 32, in the form of a crucible (40), to fabricate polycrystalline silicon ingots.